



US006189616B1

(12) **United States Patent**
Gano et al.(10) Patent No.: **US 6,189,616 B1**
(45) Date of Patent: **Feb. 20, 2001**(54) **EXPANDABLE WELLBORE JUNCTION**(75) Inventors: **John C. Gano, Carrollton; Tommie A. Freeman, Flower Mound; Jim R. Longbottom, Magnolia; John S. Bowling, Dallas, all of TX (US)**(73) Assignee: **Halliburton Energy Services, Inc., Dallas, TX (US)**

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/522,913**(22) Filed: **Mar. 10, 2000****Related U.S. Application Data**

(62) Division of application No. 09/086,716, filed on May 28, 1998.

(51) Int. Cl.⁷ **E21B 7/08; E21B 43/14**(52) U.S. Cl. **166/298; 166/55.1; 166/117.6; 166/313; 166/376; 175/81**(58) Field of Search **166/50, 55.1, 117.5, 166/117.6, 298, 313, 376; 175/79, 80, 81, 82**(56) **References Cited****U.S. PATENT DOCUMENTS**

2,331,293	*	10/1943	Ballard	166/117.5
2,397,070		3/1946	Zublin	
4,444,276		4/1984	Peterson, Jr.	
5,318,122		6/1994	Murray et al.	166/313
5,330,007		7/1994	Collins et al.	166/313
5,348,095		9/1994	Worrall et al.	

5,388,648	2/1995	Jordan, Jr.	166/380
5,425,559	6/1995	Nobileau	
5,655,602	8/1997	Collins et al.	166/313
5,695,008	12/1997	Bertet et al.	166/187
5,718,288	2/1998	Bertet et al.	166/287
5,771,972	*	6/1998	Dewey et al.
5,794,702	8/1998	Nobileau	
5,813,465	*	9/1998	Terrel et al.
5,937,955	*	8/1999	Nims et al.
6,059,037	*	5/2000	Longbottom et al.

FOREIGN PATENT DOCUMENTS

0136935	4/1985	(EP)
0795679A2	2/1997	(EP)
WO96/23953	8/1996	(WO)
9706345	2/1997	(WO)
WO99/13195	3/1999	(WO)

OTHER PUBLICATIONS

Drilling Engineering Association "Rapid Junction" Project Proposal Form, Undated 1998 DEA Rapid Junction Proposal, dated Jan. 15, 1998.

* cited by examiner

Primary Examiner—George Suchfield

(74) Attorney, Agent, or Firm—William M. Imwalle; Marlin R. Smith

(57) **ABSTRACT**

Multiple wellbores are interconnected utilizing a deflection device having a guide layer of lower hardness than the body of the deflection device, and a cutting tool having a guide portion and being operative to cut through the deflection device guide layer and a tubular structure lining a wellbore.

13 Claims, 22 Drawing Sheets